NARUS Business Infrastructure Platform

NARUS

Turning Customer Knowledge Into Action

Service Providers in today's Internet protocol (IP) services marketplace are buffeted by changes coming from every direction, including rapid innovation in network technology, emergence of e-marketplace and a proliferation of new services ranging from voice-over-IP and unified messaging to digital music and mobile commerce. Add to that, fierce competition, decreasing prices and increasingly sophisticated customer preferences and it makes for an extremely tough climate to operate in. So as a service provider, how do you maintain your competitive edge? You intelligently manage your customers, services, and business models.

To thrive under these challenging market conditions you need a robust Internet Business Infrastructure, or IBI, built on a solid foundation that provides complete information about customer activities on the network, in real time.

By turning that customer knowledge into action, you can:
- Retain and attract new customers
- Enhance your competitive position
- Reap the financial rewards of offering highly differentiated services

NARUS is the only company that offers a carrier-class, revenue-grade business infrastructure platform designed to collect, process and aggregate network information in real time. Our platform provides the critical link between your network infrastructure and key operational and business applications and enables the creation of solutions to solve your immediate problems.

The NARUS Platform enables you to:

- Profile customer usage to spot trends and plan for new services

- Define and deliver targeted services and improve your profitability

- Monitor and track service performance to determine if you met or exceeded your SLA

- Understand and manage your network to deliver high quality of service

Gain a decisive competitive advantage by:

- Identifying patterns that lead to churn so you can retain your profitable customers

- Detecting and defeating policy abuse

- Enhancing differentiation and offering a range of value-based services

- Increasing revenue with guaranteed collection of data

NARUS Business Infrastructure Platform—Built for the Next Generation and Beyond

The NARUS IBI Platform is designed to thrive under the most extreme performance demands imaginable. Engineered as an integrated system solution, the NARUS IBI Platform has the following capabilities:

- Maximum visibility by complementing collection of IP information directly from the network with data from network and service devices (routers, gateways, switches, databases, directory services)

- Capturing information from the physical layer to the application layer in Ethernet, ATM and SONET network

- Transformation of IP Network data into actionable business events

- Carrier–class scalability to support tens of millions of users

- Easy integration into applications using open standards-based format—Internet Protocol Detail Records (IPDRs)

NARUS Deployment
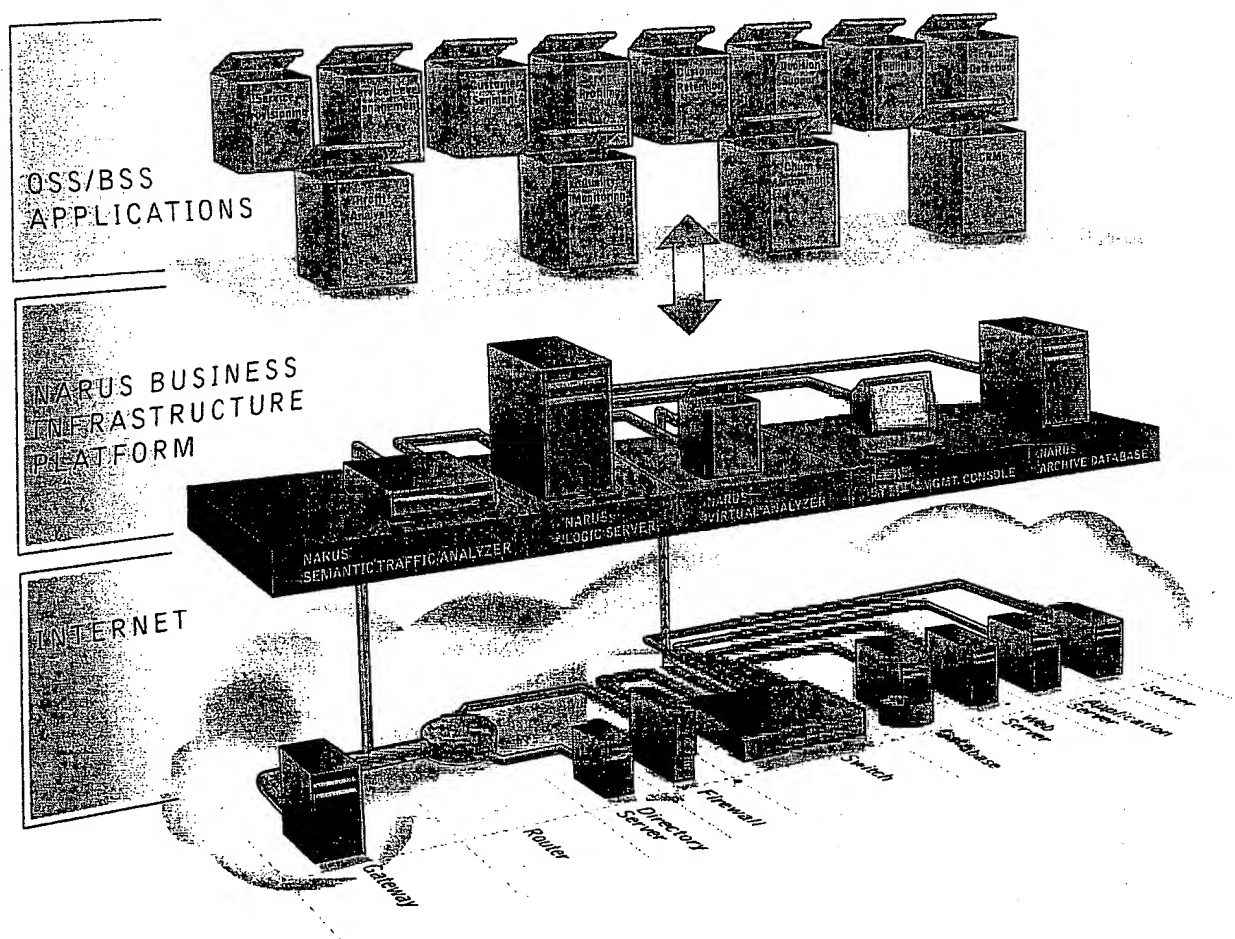
NARUS Business Infrastructure Platform Architecture

The NARUS Platform is based on a modular system architecture that is designed to meet the exacting standards of traditional voice network reliability and performance. By combining the capabilities of a proven distributed architecture with a fault-tolerant, messaging framework, the NARUS Platform provides a solid foundation for highly-reliable, fault-tolerant data collection, aggregation and application services. With the NARUS Platform, service providers can develop and deploy IBI solutions with full revenue assurance.

The NARUS IBI Platform deploys:
- NARUS Analyzers to capture IP session information
- NARUS LogicServer™ software to transform session information to actionable business events
- NARUS application services to provide mediation for various business applications

How the Narus Platform Works

Universal Data Collection—NARUS Analyzers

Universal data collection services provide complete abstraction for data collection, enabling high-level services to be created without requiring knowledge of network and service element variations. NARUS Analyzers deliver highly optimized data collection services to the platform. Analyzers are subsystems that non-intrusively detect, extract, and characterize in real-time, the contextual information transacted by an application or service deployed in the network. Analyzers build a statistical repository of essential user session and application activity over time. By using data filtering, transformation, and aggregation techniques, they optimize data collection across all applications and, where applicable, repurpose the collected data for multiple applications. With caching memory, the Analyzer ensures revenue-grade performance with no data loss. The NARUS Analyzer family consists of the NARUS Semantic Traffic Analyzer and the NARUS Virtual Analyzer.

Semantic Traffic Analyzers

NARUS Semantic Traffic Analyzers are dedicated network appliances that capture and analyze data streams directly from high-speed, carrier-grade IP networks. Connected at key locations in the service provider's network, Semantic Traffic Analyzers perform protocol analysis of captured data streams. These Analyzers use NARUS' patented Semantic Traffic Analysis™ (STA) technology to understand the semantics of a user session across all seven layers of the network stack. This remarkably granular information is collected and processed at line speeds without affecting network performance.

NARUS Virtual Analyzers

NARUS Virtual Analyzers are lightweight software agents that leverage industry standard protocols, as well as proprietary data formats, to extract information from various network devices and service elements that transmit or terminate traffic. These elements include routers, switches, gateways, firewalls, Web servers, proxies, application servers, session managers, directory services, and more. NARUS Virtual Analyzers access these network elements, retrieve session data, and parse various data formats to generate meaningful usage information. Each Virtual Analyzer is designed for a specific type of data source. The NARUS Platform is packaged with a variety of Virtual Analyzers, some of which include general-purpose, standards-based agents (e.g. SNMP, Radius and DNS), while others are custom and vendor specific (e.g. Cisco NetFlow, Cisco uOne, Lucent Bulkstat, and CacheFlow). New network elements can be added easily using the NARUS Data Collection Toolkit.

The filtering, transformation and aggregation techniques used by the Analyzers enable significant data reduction, by as much as 100:1. The information processed by each Analyzer is categorized and normalized, and is internally represented in the form of an IPDR. IPDRs generated by Analyzers are reliably delivered to various aggregation and processing services in the NARUS Platform, where they are further aggregated and correlated with customer-specific information.

NARUS Platform Attributes

- Comprehensive, fully integrated Business Infrastructure Platform

- Compatible with existing networks

- Real-time, universal data collection

- Carrier-grade scalability

- Efficient, reliable performance

- Full revenue assurance
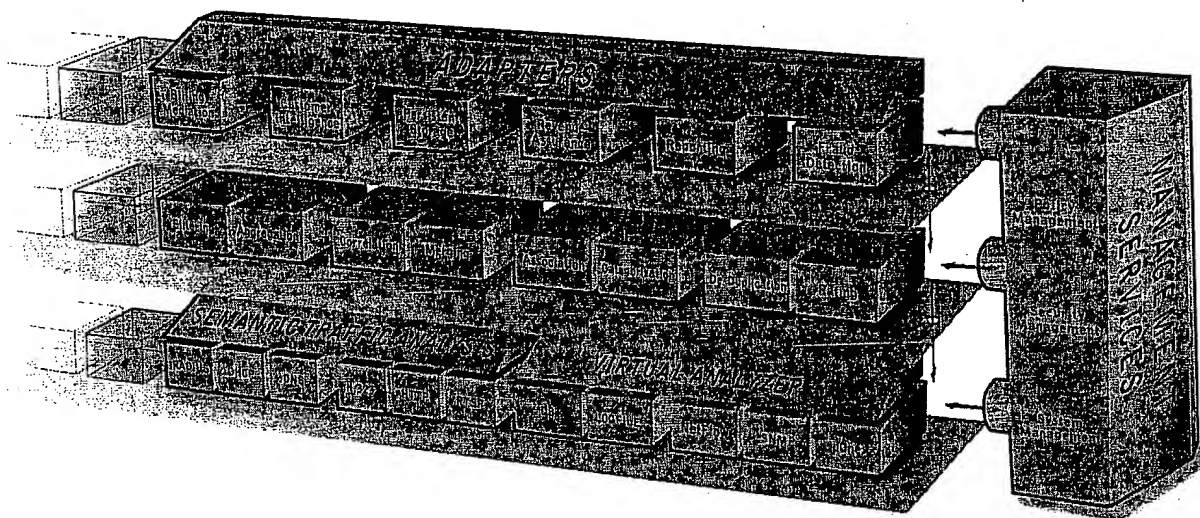
Real-time, Policy-Driven Data Processing—NARUS LogicServer

The NARUS Platform supports a wide range of data processing services that include filtering, de-duplication, aggregation, correlation, and association, among many others. These services form the basis for building complex, aggregation logic. Using these basic services, the NARUS LogicServer transforms network activity into actionable business information. The LogicServer is a real-time, high-performance software server that applies user-defined policies to raw session details received from NARUS Analyzers. By compiling session details from multiple Analyzers and applying subscriber related information, the LogicServer provides a comprehensive view of customer session activity.

Real-Time, Data-Flow Analysis

The NARUS LogicServer is specifically engineered to deliver real-time performance for the most demanding IBI applications. Using a unique data management architecture that combines the key attributes of a memory-resident database and a data-flow engine, the LogicServer delivers breakthrough performance and efficiency by fully exploiting the benefits of processing and managing data in memory during run-time. Benchmarked at several million transactions per minute, the LogicServer's performance and efficiency provides the NARUS Platform with the scalability to handle tens of millions of subscribers.

Complete Recoverability for Revenue Assurance

The NARUS LogicServer delivers unparalleled performance without comprising accuracy and reliability. Unlike conventional database-driven solutions that use disk-intensive operations, the LogicServer uses disk I/O only for persistence and transaction recoverability. Although aggregations are performed in memory during routine processing, data and state transitions are serialized and regularly saved to disk, guaranteeing complete recoverability in the event of a system failure. The LogicServer automatically handles recovery from a system failure by performing a transactional rollback and reprocessing of raw session information.

## NARUS Application Services— Mediation for Business Applications

As a fully integrated usage management solution, the NARUS Platform provides various classes of application services for mediation of business applications.

Billing Mediation Services

The Billing Mediation services provide the basis for implementing and managing billing plans for IP services. Out-of-the-box mediation services provide support for a wide range of billing plans enabling service providers to offer high-value services such as IP telephony, Internet messaging, streaming media, and resource utilization among others.

Decision Support Services

The Decision Support services available in the NARUS Platform deliver reports for various applications such as subscriber intelligence, service level monitoring, and policy abuse. Reports include web-traffic profiling, voice-over-IP and videoconferencing usage distribution, Internet newsgroup statistics, policy infractions monitoring, network and service utilization, response times and many more.
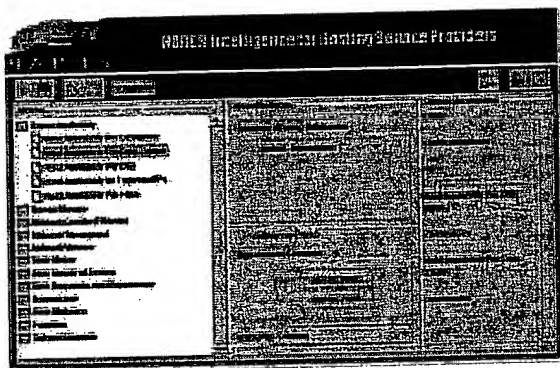
By providing detailed information, these reports aid service providers in:
- Understanding subscriber behavior for targeted marketing of services
- Efficient capacity planning for new services
- Improving operational efficiencies and
- Monitoring and delivering of service level agreements

Output Content Adaptation Services

These services provide conversion, formatting, adaptation and communication of usage records to business applications. The NARUS Platform includes pre-built adapters for Internet Protocol Detail Record (IPDR), ASCII, XML, Compact XML, TIBCO, and CORBA data formats.

Archival Services

Archival services are used for storing usage data generated by the LogicServer, in the form of IPDRs. The Archives export well-defined schemas and interfaces, allowing operators to use any off-the-shelf ODBC-compliant reporting package to generate customized views and graphs.

Revenue Assurance Services

Revenue Assurance services include comprehensive accounting, event logging, auditing, verification, and reconciliation across all stages of data collection, processing and delivery of IPDR to business applications.

System Management Services— NARUS Management System

The NARUS Platform provides comprehensive and cost-effective system management through the NARUS Management System (NMS), an array of sophisticated techniques that provide global visibility and control over the operational performance of all platform system components. NMS uses distributed management agents to facilitate administrative tasks, such as activation and de-activation of system processes; addition, modification or deletion of aggregation rules; license and access rights management; and diagnostics and health monitoring. System status, alarms, and administrative actions are displayed on an intuitive graphical-user interface (GUI) console that operators can use to efficiently administer the whole system.
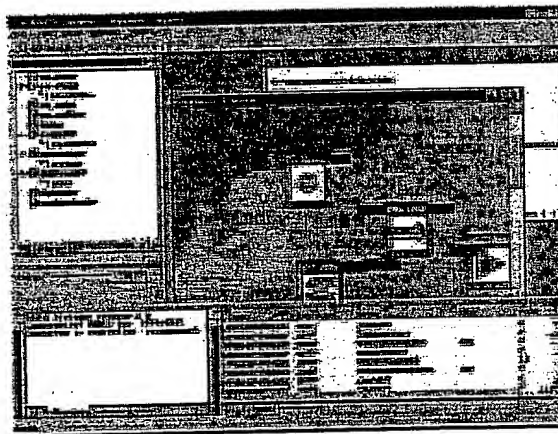
NMS supports multiple consoles in a single system, enabling remote management and control from multiple locations. In addition, key platform elements support SNMP MIBs and agents that enable monitoring and management using leading network management systems.

NARUS Business Infrastructure Platform Offers Significant Core Benefits

By using NARUS, service providers around the world are able to sustain profitable growth by identifying and driving new opportunities, delivering new services, maximizing service efficiency and customer satisfaction, and capturing the maximum value for their services. The NARUS Platform offers the following benefits.

Features	Benefit to Service Providers
Full revenue assurance — high-reliability, availability and fault-tolerance, high data integrity, no data loss, no duplication	
Real-time, universal data collection	
RuleSets for policy-based aggregation and correlation	
Highly scalable, bigger savings	
Distributed architecture	
Compatible with existing network infrastructures	
Robust distributed system management	
Enhanced security, encryption and access control using SSL	
Open API	
Standards compliant, extensible and adaptable	
Multiple output formats – IPDR, XML, Compact XML, TIBCO	

The Gold Standard in Business Infrastructure Platforms

NARUS is quickly becoming the gold standard business infrastructure platforms – the platform that others must match or exceed. NARUS is the only company to offer a carrier-class, revenue-grade business infrastructure platform designed from the ground up to collect, process, and apply detailed customer and network usage information in real time. Engineered as an integrated system solution, the NARUS Platform has the flexibility to provide traditional mediation services, and compelling new mission-critical business applications. The NARUS Platform provides the critical link between network infrastructures and key operational and business support systems.

Specifications

NARUS Semantic Traffic Analyzer:
• Data collection appliance in 1U, 2U and 4U configurations
For more information, see NARUS Semantic Traffic Analyzer datasheet

System Requirements Summary

NARUS Virtual Analyzer:
• Hardware platforms: Sun Microsystems Netra T1 or above, Intel Pentium III
• Operating system: Solaris 2.7 or RedHat Linux 6.2
• Memory: 512MB
• Disk: 9GB

Virtual Analyzers	
SNMP	Extracts multi-layer statistics from various types of SNMP MIBs using a Network Management Query Language (NMQL—a flexible SQL-like query language written by NARUS). The Virtual Analyzer can collect information from various MIBs including MIB-II, enterprise MIBs, and ATM accounting MIBs.
NetFlow	The NetFlow Virtual Analyzer collects NetFlow flows generated by Cisco's NetFlow enabled routers and switches. Supported versions include v1, v5, v7, and v8.
UOne	Processes logfiles of call detail records generated by Cisco's Unified Open Network Exchange (UOne) application.
Bulkstat	Collects layer 2 statistics from Lucent ATM and frame relay switches.
CacheFlow	Provides caching performance metrics such as success rates and volume of data transferred by CacheFlow's caching appliances.
Logfile	Reads usage and accounting data from any ASCII logfile and generates normalized accounting records.
All other sources	NARUS Data Collection Toolkit extends capabilities to collect from other sources— for more information see software development kit.

NARUS LogicServer:
• Hardware platforms: Sun Microsystems E250 or above, Intel Pentium III
• Operating system: Solaris 2.7 or RedHat Linux 6.2
• Memory: 2GB memory, 4GB root disk
• Disk: 18GB

NARUS Management System:
• Hardware platforms: Intel Pentium III
• Operating system: Microsoft Windows NT 4.0 (running SP 3.0+)

NARUS Archive (optional):
• Hardware platforms: Sun Microsystems E250 or above
• Operating system: Solaris 2.7
• Database: Oracle 8i

About NARUS

Based in Palo Alto, California, NARUS is the first and only company formed for the sole purpose of developing and marketing complete Internet Business Infrastructure (IBI) Solutions. NARUS solutions give IP service providers the flexibility to implement new services and business models profitability, and at will.

NARUS™

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